

AMENDMENTS TO THE CLAIMS

Please amend the claims as follows:

1. (Amended) A system ~~for detecting and enhancing meteorological imagery of dust clouds~~ comprising:

a storage portion operable to store ~~collector for storing~~ multispectral optical-spectrum imagery data having from multiple channels relating to different wavelengths across the visible, shortwave infrared, and thermal infrared portions of the optical ~~spectrum, spectrum;~~

a processor ~~operatively coupled to said collector, wherein the processor~~ operable to process ~~receives the multispectral optical-spectrum imagery data and processes the digital data by:~~ by performing a numerical atmospheric correction on a portion of the multispectral optical-spectrum imagery data for removal of molecular scatter within all of the visible-spectrum channels, based on radiative transfer calculations stored in pre-computed look-up tables and indexed as a function of solar and sensor geometry, by determining the pixel background for each pixel of the an image corresponding to the multispectral optical-spectrum imagery data by combining known earth location data with data from a terrestrial database, and ~~employing a background-dependent algorithm to compute by computing, via a background-dependent algorithm,~~ the dust enhancement variable Δ , Δ ; and

a display comprising ~~means for displaying the multispectral imagery coupled to the processor, wherein the means for displaying the multispectral imagery comprises a red, blue and green color~~ display portions operable to display for displaying the processed multispectral optical-spectrum imagery in the visible light spectrum via a hue/saturation decomposed color technique.

2. (Amended) The system of claim 1, wherein said processor is further operable to calculate, ~~whereby~~ when a pixel is determined to have a water background, ~~the processor calculates the a~~ log-scaled normalized difference (D) between the two channel reflectivities according to the a relation:

$$\Delta = \frac{\alpha_{865} - \alpha_{412}}{\alpha_{865} + \alpha_{412}}$$

$$D = \log_{10} \left(\frac{R_2 - R_3}{R_2 + R_3} \right),$$

and to byte-scale ~~byte-scaling this quantity~~ D over a the range [-0.40, 0.15],

wherein a ~~where the~~ bidirectional reflection function ($R_k \in [0, 1]$) at channel (k) is expressed in terms of channel radiance (I_k) as:

$$R_k = \frac{\pi I_k}{\mu_o F_{o,k}}$$

and μ_o and $F_{o,k}$ are the cosine of the solar zenith angle and band-weighted solar spectral flux, respectively.

3. (Amended) The system of claim 2, wherein said storage portion is operable to store the multispectral optical-spectrum imagery from a first channel having ~~has~~ a central wavelength in the shortwave infrared at approximately 0.83-0.88 μm , a second channel having ~~has~~ a central wavelength in the indigo/blue part of the spectrum at approximately 0.41-0.46 μm , and a third channel having ~~has~~ a central wavelength in the green part of the spectrum at approximately 0.50-0.55 μm .

4. (Amended) A system ~~for detecting atmospheric dust~~ comprising:
a storage portion operable to store ~~collector for storing~~ multispectral optical-spectrum imagery data having from multiple channels relating to different wavelengths,
a processor ~~operatively coupled to the collection means, wherein the processor~~ operable to process ~~receives~~ the multispectral optical-spectrum imagery data, ~~and processes the digital data by:~~ performing a numerical atmospheric correction on a portion of the multispectral optical-spectrum imagery data for removal of molecular scatter within all of the visible-spectrum channels, based on radiative transfer calculations stored in pre-computed look-up tables and indexed as a function of solar and sensor geometry, by ~~determining the pixel background for each pixel of the~~ an image by

combining known earth location data with data from a terrestrial database, and by computing, via employing a background-dependent algorithm, ~~to compute~~ the dust enhancement variable D ,

wherein said processor is further operable, when a pixel is determined to have a water background, background such that $D=D_{\text{wat}}$ ~~and the processor calculates to calculate a the~~ log-scaled normalized difference (D_{wat}) between a second channel reflectivity and a third channel reflectivity ~~reflectivities~~ according to the relation:

$$D_{\text{wat}} = \log_{10} \left(\frac{R_2 - R_3}{R_2 + R_3} \right),$$

and to byte-scale ~~byte-scaling~~ this quantity over the range $[-0.40, 0.15]$, where ~~a the~~ bidirectional reflection function ($R_k \in [0, 1]$) at channel (k) is expressed in terms of channel radiance (I_k) as:

$$R_k = \frac{\pi I_k}{\mu_o F_{o,k}}$$

and μ_o and $F_{o,k}$ are the cosine of the solar zenith angle and band-weighted solar spectral flux, respectively.

5. (New) A device for use with an image comprising pixels derived from multispectral optical-spectrum imagery data from multiple channels relating to different wavelengths across the visible, shortwave infrared, and thermal infrared portions of the optical spectrum and with a display, said device comprising:

a removing portion operable to remove, from a first portion of the pixels, effects of atmospheric molecular scattering;

a scaling portion operable to scale spectral radiance of a second portion of the pixels;

a flagging portion operable to flag a third portion of the pixels as cloudy;

a dust enhancement portion operable to define a dust enhancement parameter;

a scaling portion operable to scale the dust enhancement parameter;

a differentiating portion operable to differentiate, within the third portion of the pixels, a set of cloud pixels from a set of dust pixels based on the scaled dust enhancement parameter; and

a changing portion operable to change color of the set of dust pixels.

6. (New) A method of modifying an image comprising pixels derived from multispectral optical-spectrum imagery data from multiple channels relating to different wavelengths across the visible, shortwave infrared, and thermal infrared portions of the optical spectrum and with a display, said method comprising:

- removing, from a first portion of the pixels, effects of atmospheric molecular scattering;
- scaling spectral radiance of a second portion of the pixels;
- flagging a third portion of the pixels as cloudy;
- defining a dust enhancement parameter;
- scaling the dust enhancement parameter;
- differentiating, within the third portion of the pixels, a set of cloud pixels from a set of dust pixels based on the scaled dust enhancement parameter; and
- changing color of the set of dust pixels.